

State's water needs require bold approach

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By John Garamendi - Special to The Bee

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Like a splash of cold water to the face, the recent startling reports from state water surveyors should be enough to wake up our state.

As The Bee reported May 2, the Sierra snowpack stands at just 67 percent of average levels, and March and April were the driest in recorded history. Local governments have been told to prepare for rationing. But as we proceed rapidly into a world changed by global warming, a spring like 2008's may be the new normal.

Climate change is anticipated to have three major impacts on California's future water supply. First, the Sierra Nevada snowpack, California's primary water reservoir, is anticipated to shrink 30 percent to 90 percent by the end of the century. Second, warmer temperatures will produce warmer winter storms – the classic Pineapple Express – which will lead to more precipitation falling as rain instead of snow, increased threat of flooding, more pressure on our already vulnerable levee systems and serious issues surrounding our ability to store water. And third, rising sea levels will lead to an influx of salt water on our coastline and rivers, affecting water quality, habitat and further reducing our already limited freshwater supply. Add to this the pressure California's population growth (600,000 people per year) is placing on water resources, not to mention the declining health of the Sacramento-San Joaquin Delta and shrinking supplies from the Colorado River. The simple truth is California's water infrastructure cannot withstand the dual stresses of climate change and population growth. We must adapt and manage our water more efficiently.

Our water managers rely on 75 years of historical data to predict water patterns and manage our reservoirs and flood-control systems. In the context of climate change, this historic data is obsolete. Water managers need real-time information that allows them to adjust the water storage and flood capacity of our reservoirs based on information collected daily and hourly in the event of a major storm.

To meet these challenges, I have worked with leading hydrologists, meteorologists and space scientists from around the nation to develop a pilot program for "adaptive" water and flood management of the American River watershed, a plan that could eventually be used in all California river systems. This innovative initiative – which I call H2O, 2.0 – uses existing technologies and could be fully implemented in one year, tested over four years and then used to replace the historic average methodology in making critical water and flood decisions. The cost is expected to be less than \$4 million over the four-year period.

California's water future could look like this: Snowpack depth, density and water potential, the rate of snowmelt, actual hourly rainfall, temperature of incoming storms, snow fall elevation and related rainfall potential, ability of soil to absorb moisture, and other watershed conditions are remotely monitored and measured in real time using a network of ground-based instrumentation. This data is complemented by satellite photography, ground and satellite radar,

and drone aircraft to monitor offshore storms. These measurements are instantaneously fed into advanced computerized statistical models, giving scientists and water managers the information needed to better predict water flows and control them in real time – which means we can maximize our water supply by retaining water behind the dams when real time information indicates a low risk of flooding, or release water from the reservoirs earlier when real time information indicates the likelihood of a flood.

With the bad news on the Sierra snowpack last week, it is clear that California must find new ways to operate its dams and conveyance infrastructure to improve water supply reliability while simultaneously lowering flood risks. Given the state's current budget crisis, our efforts to improve water supply and flood protection must also be cost-effective and innovative.

While just one piece of the overall water puzzle, H2O, 2.0 represents the next generation of thinking in resource management. This project can provide critical data that enables the state's water managers to make more efficient use of our limited water resources for agricultural, urban and environmental uses.

H2O, 2.0 has the potential to offer both greater water supply and improved flood management at a small cost. The good news is that California's water future could begin today.